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EXAMINER	
NATALINI, JEFF WILLIAM	
ART UNIT	**PAPER NUMBER**
2858	

DATE MAILED: 06/01/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/813,621	BRABERS, PETERALV	
	Examiner	Art Unit	
	Jeff Natalini	2858	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-12 and 14-20* is/are rejected.

7)☒ Claim(s) *13* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *31 March 2004* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *8/31/04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Drawings

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the distance between the electrodes of the pairs of voltage electrodes increases from the first current electrode (9) toward the second current electrode (11) must be shown or the feature(s) canceled from the claim(s). Note the reference characters in parenthesis provide no limitations to the claims, but since it is describes as the distances increasing between electrode 9 to electrode 11, this should be shown in the drawings. No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner,

the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

2. Claims 10 and 12 are objected to because of the following informalities: "neighbouring" is misspelled, should be replaced with "neighboring". Appropriate correction is required.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1, 5, and 17 are rejected under 35 U.S.C. 102(b) as being anticipated by Ridd et al. (5032794).

In regard to claims 1 and 17, Ridd et al. discloses a device for measuring the resistivity of subsurfaces (abstract last sentence- by determining conductivity, resistivity is determined) comprising: a multi-channel cable along the water covered subsurface (fig 2 (11 and 10)) whereby the cable has an array of electrodes positioned in a line comprising a first current electrode (fig 3 (16-left)), a second current electrode (fig 3 (16-right)), and a number of voltage electrodes located between the current electrodes (fig 4 (15), four electrodes are located between the two current electrodes).

In regard to claim 5, Ridd et al. discloses whereby a first voltage electrode (fig 3-15 - electrode to the left of the middle) is separated from the first current electrode (fig 3 - 16 left of middle) at a distance that is at least equal to the distance between a second voltage electrode (fig 3- 15 first electrode to the right of the middle) and the second current electrode(fig 3 – 16 right of middle), whereby further electrodes (15-second to the right of the middle) are located between the second voltage electrode and the second current electrode.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 2, 6-12, 15, 16, and 18, are rejected under 35 U.S.C. 103(a) as being unpatentable over Ridd et al. (5032794) in view of Bischoff et al. (4298840).

In regard claims 7, 15, and 16, Ridd et al. discloses a method for measuring the resistivity of subsurfaces (abstract last sentence- by determining conductivity, resistivity is determined) comprising:

a multi-channel cable (fig 2, cable (11) guides/tows cable with line of electrodes (10)) along the water covered subsurface (fig 2 (21)) whereby the

cable has an array of electrodes positioned in a line comprising a first current electrode (fig 3 (16-left)), a second current electrode (fig 3 (16-right)), and a number of voltage electrodes located between the current electrodes (fig 4 (15), four electrodes are located between the two current electrodes);

generating an electrical field between the current electrodes by injecting an electrical current (abstract 2nd sentence; col 3 line 17-25);

measuring of a voltage gradient associated with the generated electric filed between a first and second voltage electrode of the array of voltage electrodes (col 3 line 20-27, col 1 line 48-50);

measuring of a voltage gradient associated with the generated electric field between electrodes, where the further are located between the second voltage electrode and the second current electrode (col 3 line 20-27, col 1 line 48-50, fig 3 shows four voltage electrodes between the two current electrodes) where a first pair of voltage electrodes [fig 3 shows four electrodes between the current electrodes to be referred to as numbers 1 left most electrode to 4 right most electrode, the first pair is (1,2), second pair (2,3), and third pair (3,4)] is larger (pair 2 is larger than 3) than or equal (pair 1 is equal to 3) to the distance between a second pair of voltage electrodes located closer to the second current electrode; and where the distance between the electrodes of the at least two pairs of voltage increases from the first to the second current electrodes (the distance between pair 1 increases to the distance between pair 2)

calculating a resistivity as a function of depth between the water covered subsurface (col 3 line 8-14; col 1 line 12-14).

Ridd et al. lacks specifically disclosing where the cable is towed and measuring a voltage gradient associated with the electric field between pairs of voltage electrodes.

Bischoff et al. discloses towing the cable (fig 1- vessel (2) tows cable (1)) and measuring a voltage gradient associated with the electric field between pairs of voltage electrodes (abstract first sentence) located in a straight line (fig 5).

It would have been obvious to one with ordinary skill in the art at the time the invention was made for Ridd et al. to tow the cable and measure a voltage gradient between pairs of voltage electrodes as disclosed by Bischoff et al. in order to determine electrical resistivities of various parts of a marine bottom (abstract first sentence).

In regard to claims 2, 6, 9, and 18, Ridd et al. discloses measuring of a voltage gradient associated with the generated electric field between electrodes (col 3 line 20-27, col 1 line 48-50, fig 3 shows four voltage electrodes between the two current electrodes) and shows where different distances are between the three pairs of electrodes between the current electrodes [fig 3 shows four electrodes between the current electrodes to be referred to as numbers 1 left most electrode to 4 right most electrode, the first pair is (1,2), second pair (2,3), and third pair (3,4)].

Ridd et al. lacks specifically disclosing where the distance between the electrodes decreases from the first to last pair and wherein the gradient is determined between the pairs.

Bischoff et al. discloses where the distance between the electrodes decreases from the first pair (fig 5 (35,36) distance = 8h) to the last pair (fig 5 (32,33) distance = h) and determining the gradient between pairs of electrodes (abstract).

It would have been obvious to one with ordinary skill in the art at the time the invention was made for Ridd et al. to decrease the distance between the first pair of electrodes throughout to the last pair as taught by Bischoff et al. in order to have a fixed ratio between each pair of electrodes and the distance between each pair of electrodes with the supply electrodes (col 3 line 2-4) and it would have been obvious to one with ordinary skill in the art at the time the invention was made for Ridd et al. to measure a voltage gradient between pairs of voltage electrodes as disclosed by Bischoff et al. in order to determine electrical resistivities of various parts of a marine bottom (abstract first sentence).

In regard to claim 8, Ridd et al. discloses whereby a first voltage electrode (fig 3-15 - electrode to the left of the middle) is separated from the first current electrode (fig 3 - 16 left of middle) at a distance that is at least equal to the distance between a second voltage electrode (fig 3- 15 first electrode to the right of the middle) and the second current electrode(fig 3 – 16 right of middle), whereby further electrodes (15-second to the right of the middle) are located between the second voltage electrode and the second current electrode.

In regard to claims 10 and 11, Ridd et al. lacks wherein a voltage gradient is measured between pairs of neighboring voltage electrodes, and wherein the gradient is measured of pairs with a common voltage electrode.

Bischoff et al. discloses wherein a voltage gradient is measured between pairs of neighboring voltage electrodes, and wherein the gradient is measured of pairs with a common voltage electrode (col 3 line 5-15).

It would have been obvious to one with ordinary skill in the art at the time the invention was made for Ridd et al. to measure the gradient of a pair of neighboring voltage electrode and that share a common voltage electrode as taught by Bischoff et al. in order to be able to use fewer electrodes in the system (col 3 line 7-9).

In regard to claim 12, noisy resistivity curves resulting from voltage measurements between the common voltage electrode and two neighboring electrodes due to noise on the common voltage electrode (col 6 line 44-46), are corrected in accordance with adjacent resistivities in order to obtain a smooth apparent resistivity curve (col 6 line 25-48).

7. Claims 3, 4, and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ridd et al. (5032794) in view of Bischoff et al. (4298840) as applied to claims 1 (Bischoff et al. is not needed for claim 1) and 7 above, and further in view of Srnka (4617518).

Ridd et al. lacks wherein the first/second current electrode is located near a first end of the cable that is connected to a vessel that tows the cable substantially parallel to the water covered subsurface such that the first current electrode is located near the vessel and the second is remote.

Srnka teaches wherein the first/second current electrode (fig 1 – (33) can be "labeled" first or second electrode- for claims 3 and 4) is located near a first end of the cable (31) in an electromagnetic surveying system so that the vessel (1) tows (col 4 line 32-37) the cable substantially parallel to the subsurface (25) so that the first current electrode (33) is located near the vessel and the second (34) is remote of the vessel (whether the first electrode is located "near" and the second "remote" is relative, but it is disclose the first electrode is closer to the end then the second).

It would have been obvious to one with ordinary skill in the art at the time the invention was made for Ridd et al. to have an electrode near the first end of the cable, wherein the vessel tows the cable substantially parallel to the subsurface where a first electrode is near the vessel and the second is further from the vessel as taught by Srnka in order to encompass measurements in the whole body of water (col 4 line 32-34).

8. Claims 19 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ridd et al. (5032794) in view of Barker (4246538).

Ridd et al. lacks wherein the electrode configuration has one of the current electrodes more remote from the voltage electrodes than the other current electrode;

and whereby the distance along the cable between the voltage electrodes increases from the closest current electrode toward the more remote current electrode.

Barker discloses an electrode configuration (fig 4, 12th configuration) wherein one of the current electrodes (C on right) is more remote from the voltage electrodes (P's) than the other current electrode (C on left); and whereby the distance along the cable between the voltage electrodes increases from the closest current electrode toward the more remote current electrode (col 4 line 54 – col 5 line 17, teach that distances between electrodes increase and uses many different spacing combinations for electrodes).

It would have been obvious to one with ordinary skill in the art at the time the invention was made for Ridd et al. to have one current electrode more remote from the voltage electrodes and whereby the distance along the cable between the voltage electrode increases toward the more remote electrode as taught by Barker in order to plot a resistivity/electrode spacing curve (col 4 line 54-56).

Allowable Subject Matter

9. Claim 13 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The prior art does not teach or render obvious wherein noise on the common voltage electrode resulting from measurements at tow pairs of voltage electrodes is removed by compensating the measurements according to the equation s2 = s1 *

K1/K2, where K1 and s1 are the geometrical factor and the resistivity noise related to a resistivity value obtained by measuring the voltage gradient between the first pair, and K2 and s2 are the geometrical factor and the resistivity noise related to a resistivity value obtained by measuring the voltage gradient between the second pair in the combination as claimed.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Lee et al. (6636046) has a resistivity probe where voltage electrodes are located between current electrodes and states that the distances between the electrodes can be uneven. Wynn (6236212) discloses an electrode sensor cable that tows the electrodes across the sea floor. Sorensen (5587659) teaches measuring resisitivity with an electrode cable that is used in water magazines, and compensates for noise in the measurement.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeff Natalini whose telephone number is 571-272-2266. The examiner can normally be reached on M-F 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Lefkowitz can be reached on 571-272-2180. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jeff Natalini

ANJAN DEB
PRIMARY EXAMINER